TECTONOPHYSICS—Volume 232—Nos. 1–4

Special Issue

SEISMIC REFLECTION PROBING OF THE CONTINENTS AND THEIR MARGINS

Papers from the 5th International Symposium on Seismic Reflection Probing of the Continents and their Margins, Banff, Alta., Canada, September 6–12, 1992, sponsored by the Geological Survey of Canada; LITHOPROBE secretariat; International Association for Seismology and Physics of the Earth's Interior; International Lithosphere program; Canadian Society of Exploration Geophysicists; INCO Canada Ltd.

Edited by

RON M. CLOWES

LITHOPROBE Secretariat and Department of Geophysics and Astronomy, 6339 Stores Road, University of British Columbia, Vancouver, B.C. V6T 1Z4, Canada

and

ALAN G. GREEN

Institut für Geophysik, ETH-Hönggerberg, CH-8093, Switzerland

LITHOPROBE

Canada's National Geoscience Project

Le projet pancanadien en sciences de la Terre

CONTENTS

Preface vii

Plate boundaries and orogens

Review of recent results from continental deep seismic profiling in Australia
B.R. Goleby, B.J. Drummond, R.J. Korsch, J.B. Willcox, G.W. O'Brien and K.D. Wake-Dyster 1

Seismic images of the Brooks Range fold and thrust belt, Arctic Alaska, from an integrated seismic reflection / refraction experiment
A. Levander, G.S. Fuis, E.S. Wissinger, W.J. Lutter, J.S. Oldow and T.E. Moore 13

A collisional crustal fabric pattern recognised from seismic reflection profiles of the Appalachian / Caledonide orogen
J. Hall and G. Quinlan 31

Lithoprobe East onshore–offshore seismic refraction survey —constraints on interpretation of reflection data in the Newfoundland Appalachians
F. Marillier, J. Hall, S. Hughes, K. Louden, I. Reid, B. Roberts, R. Clowes, T. Coté, J. Fowler, S. Guest, H. Lu, J. Luetgert, G. Quinlan, C. Spencer and J. Wright 43

Lateral variations in the deep crustal structure at the Iberian margin of the Valencia trough imaged from seismic reflection methods
J. Gallart, N. Vidal, J.J. Dañobeitia and the ESCI-Valencia Trough Working Group 59

A deep seismic reflection survey across the Betic Chain (southern Spain): first results
V. García-Dueñas, E. Banda, M. Torné, D. Córdoba and ESCI-Béticas Working Group 77

Crustal structure of the external variscides in northwest Spain from deep seismic reflection profiling
A. Pérez-Estaún, J.A. Pulgar, E. Banda, J. Alvarez-Marrón and ESCI-N Research Group 91

Styles of crustal deformation in compressional orogens caused by subduction of the underlying lithosphere
C. Beaumont, P. Fullsack and J. Hamilton 119

Simple-shear deformation of the Skagerrak lithosphere during the formation of the Oslo Rift
J.E. Lie and E.S. Husebye 133

Precambrian shields
Structure of a Paleoproterozoic continent–continent collision zone: a LITHOPROBE seismic reflection profile across the Trans-Hudson Orogen, Canada
J.F. Lewry, Z. Hajnal, A. Green, S.B. Lucas, D. White, M.R. Stauffer, K.E. Ashton, W. Weber and R. Clowes 143
Three-dimensional collisional structure of the Trans-Hudson Orogen, Canada
S.B. Lucas, D. White, Z. Hajnal, J. Lewry, A. Green, R. Clowes, H. Zwanzig, K. Ashton, D. Schledewitz, M. Stauffer, A. Norman, P.F. Williams and G. Spence 161
Pre-critical wide-angle reflections from the Baltic shield: evidence for a 1.8 Ga subduction complex
G. Lindsey and D. Snyder 179
Shear-wave splitting in the lower crust beneath the Archean crust of southwest Greenland
W.P. Clement, R. Carbonell and S.B. Smithson 195
Seismic profiling of Archean crust: crustal structure in the Morton block, Minnesota River Valley subprovince
N.K. Boyd and S.B. Smithson 211

Deep lithospheric reflections
High-resolution images of the lower crust: deep seismic reflections from 15 to 180 Hz
M. Warner, B. Spaargaren, R. Jones, D. Watts and J. Doody 225
The reflectivity of magmatic underplating using the layered mafic intrusion analog
S.J. Deemer and C.A. Hurich 239
Lower-crustal deformation during terrane dispersion along strike-slip faults
B.C. Beaudoin 257
Some attributes of wavefields scattered from Ivrea-type lower crust
K. Holliger, A. Levander, R. Carbonell and R. Hobbs 267
The crust as a heterogeneous "optical" medium, or "crocodiles in the mist"
A. Levander, R.W. Hobbs, S.K. Smith, R.W. England, D.B. Snyder and K. Holliger 281
Moho reflectivity and seismic signal penetration
A.E. Barnes 299
The nature of crustal boundaries: combined interpretation of wide-angle and normal-incidence seismic data
R.E. Long, P.A. Matthews and D.P. Graham 309
The polarity of deep seismic reflections from the lithospheric mantle: evidence for a relict subduction zone
J.V. Morgan, M. Hadwin, M.R. Warner, P.J. Barton and R.P.L. Morgan 319

Rock property, drilling related and special studies
Seismic anisotropy at the Continental Deep Drilling Site (Germany)
W. Rabbel 329
Crustal "bright spots" and anisotropy from multi-component P- and S-wave measurements in southern Germany
E. Lüschen 343
Seismic mapping of the Marmousi data set with the common reflecting element method (CRE method)
H. Steentoft and W. Rabbel 355
Three-dimensional imaging of the crust using a sparse land acquisition grid: the Ecors 2.5-D experiment
J.-M. Marthelot, R. Siliqi, A. Bitri, A. Paul, A. Hirn, M. Daignières, B. Damotte, M. Specht, E. De Bazelaire, A. Lortscher and D. Rappin 365
Joint P- and S-wave velocity determination from reflected PP, SS and converted PS/SP phases from large aperture seismic reflection measurements
R. Carbonell, W.P. Clement and S.B. Smithson 379
The cover–basement contact beneath the Rawil axial depression (western Alps): true amplitude seismic processing, petrophysical properties, and modelling
L. Levato, S. Sellami, J.-L. Epard, B. Pruniaux, R. Olivier, J.-J. Wagner and H. Masson 391
Eclogite-facies shear zones—deep crustal reflectors?
D.M. Fountain, T.M. Boundy, H. Austrheim and P. Rey 411
Seismic reflection profiling in deep water: avoiding spurious reflectivity at lower-crustal and upper-mantle traveltimes
J.H. McBride, T.J. Henstock, R.S. White and R.W. Hobbs 425
Residual statics estimation in crustal reflection profiling using the simulated annealing search technique—an ensemble approach
K. Vasudevan and F.A. Cook 437